

2003 Paper 3 Question 1

Computer Design

The way in which an instruction's operands are specified is dependent on the type of internal storage in the processor. Processors which have no internal storage use memory.

- (a) Describe the advantages of including some form of internal storage, such as an accumulator, in the processor. [5 marks]
- (b) Describe *three* types of internal storage. In each case describe the format of an addition instruction. Indicate the presence of any implicit operands where necessary. [7 marks]
- (c) Describe how data-forwarding improves performance in a pipelined load/store architecture (RISC). What common characteristic of programs often causes this performance improvement to be very significant? [8 marks]